OPTICAL NON-INVASIVE EVALUATION OF FERROELECTRIC FILMS/MEMORY CAPACITORS, Sarita Thakoor, **Electric Power Section, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, California 91109 and L. Eric Cross, Pennsylvania State University, Materials Research Laboratory, University Park, PA**

NON-INVASIVE photoresponse (photocurrent/voltage and reflected/transmitted light) from perovskite titanate thin films, with its strong dependence not only on the remanent polarization, but also on the film microstructure, crystal orientation, and nature of the interfaces (state of formation/ degradation, etc.) offers an excellent "tool" for probing the ferroelectric capacitors at virtually any stage of fabrication, including on-line quality control. In fact, simultaneous measurement of spectral photoresponse and spectral reflectance, as a distinctive signature of the device probed, is an ideal, high speed, non-invasive means of evaluation for such thin films at high spatial resolution (-100 **nm)** using beam scanning. This paper will discuss three aspects of such evaluation. First, the transmittance of the film as a function of spectral wavelength is, presented as a direct function of the microstructure of the thin films. Second, the steady photoresponse at 365 nm is presented as an indicator of the quality of the capacitor in terms of its fatigue characteristics and the photon incidence can be used to condition a fatigued capacitor. Finally, the high optical E field interaction with the ferroelectric capacitor, yields a high speed photoresponse which is directly related to the remanent polarization and the operational history of the ferroelectric capacitor. Combined, these different kinds of photoresponscs provide a good signature of the device quality.